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The Digital Transformation of Business Models in the Creative Industries:

A Holistic Framework and Emerging Trends

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Highlights

- This research develops a holistic business model framework from a systematic literature review
- Identifies emerging trends in the digital transformation of business models in the creative industries
- A significant trend is the increasing adoption of multiple business models as a portfolio within one firm
- Four variants of the portfolio models are identified and illustrated
- The holistic business model framework can serve both as a cognitive instrument and a planning tool

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Abstract

This paper examines how digital technologies facilitate business model innovations in the creative industries. Through a systematic literature review, a holistic business model framework is developed, which is then used to analyse the empirical evidence from the creative industries. The research found that digital technologies have facilitated pervasive changes in business models, and some significant trends have emerged. However, the reconfigured business models are often not 'new' in the unprecedented sense. Business model innovations are primarily reflected in using digital technologies to enable the deployment of a wider range of business models than previously available to a firm. A significant emerging trend is the increasing adoption of multiple business models as a portfolio within one firm. This is happening in firms of all sizes, when one firm uses multiple business models to serve different markets segments, sell different products, or engage with multi-sided markets, or to use different business models over time. The holistic business model framework is refined and extended through a recursive learning process, which can serve both as a cognitive instrument for understanding business models and a planning tool for business model innovations. The paper contributes to our understanding of the theory of business models and how digital technologies facilitate business model innovations in the creative industries. Three new themes for future research are highlighted.

Keywords: *business model, portfolio model, holistic framework, creative industry, digital technology, digital economy, transformation, innovation*

Introduction

This paper examines how digital technologies have been used to facilitate business model innovations in the creative industries. Over the past two decades, the theory of business models has been developing rapidly, with strong interest from both academics and business leaders. Digital technologies are regarded to play a critical enabling role in facilitating business model innovations in different sectors. However, despite the growing number of research papers, journal special issues and conference sessions on business models, the concept of business model itself remains rather elusive; and the multitude of conceptualisations has slowed down cumulative research (Zott, Amit & Massa, 2011). Significant emerging trends in business model innovations, in particular, the digital transformation of business models, remain poorly understood (Spieth, Schneckenberg & Ricart, 2014; Visnjic, Wiengarten & Neely, 2016).

Through a systematic literature review, this paper develops a holistic business model framework to systematically define its key constructs (*what*); and then uses the framework to analyse *how* business models have changed and *why*, and explore the role played by digital technologies in business model innovations, based on the empirical evidence from the creative industries. The paper contributes to our understanding of the theory of business models and how digital technologies have been used to facilitate business model innovations. It also explore the potential role of the creative industries in stimulating innovation and entrepreneurship across different sectors of the economy.

The creative industries are selected for their broad coverage in both traditional (e.g. art, publishing) and digital native sectors (e.g. video games). They are not only a significant engine of economic growth, job creation, and social cohesion (Pratt & Jeffcutt, 2009), but also a hub of managerial innovation and experimentation and new organisational and

business practice to stimulate innovation and entrepreneurship in other sectors of the economy (Lampel & Germain, 2016; Petruzzelli & Savino, 2015). They are selected to serve both as an important domain for business model innovations through digital technologies and an ideal setting for a systematic study of the subject.

The holistic business model framework is developed, refined and validated through a multi-stage, recursive, learning process (Straub & Carlson, 1989). It is developed to serve both as a cognitive instrument for understanding business models (Badden-Fuller & Morgan, 2010; Furnari, 2015) and a planning tool for developing business model innovations (Doganova & Eyquem-Renault, 2009; Sabatier, Rouselle & Mangematin, 2010).

The next section reviews previous studies and develops a holistic business model framework. Then the research design and empirical work are discussed. Following this, business model innovations facilitated by digital technologies in the creative industries are systematically analysed, and emerging trends are identified. The contributions to theory and practice are then discussed. Finally, three new themes for future research are highlighted.

Literature Review: Developing a Holistic Business Model Framework

Despite the surge in literature since the late 1990s, the concept of business model is still poorly defined today. Many definitions co-exist, which are often idiosyncratic in nature, pragmatically adopted to fit the purposes of particular studies (Demil & Lecocq, 2010; Eckhardt, 2013). In everyday conversation, there appears to be a working consensus on what business model is, but as an analytical concept it lacks clarity and rigour. Business models have been approached from different perspectives in several disciplines, to serve a variety of objectives at multiple levels and scales of analysis. This has limited the ability of researchers and practitioners to draw effectively on the work of each other.

We initially identified and reviewed several well-known conceptual frameworks on business models from the literature, including the frameworks by Gordijn & Akkermann (2001); Chesbrough (2007, 2010); Johnson *et al* (2008); Lindgardt, *et al* (2009); Kiron, *et al* (2013); and selected one of the most comprehensive and widely used framework to structure the case studies - the Business Model Canvas (Osterwalder & Pigneur, 2010). However, its limitations for this research became apparently very quickly after the first few case studies. Although very effective in capturing detailed insights for understanding the business model of a specific firm and how its different constructs change over time, the amount of semi-structured details within each canvas become a liability when comparing a large number of firms or investigating emerging trends in a diverse domain such as the creative industries. Further, the canvas does not distinguish between strategic and operational constructs. Most of all, while the notion of value is central to any business model, value only features in one of the nine constructs of the business model canvas – the value proposition. It is not designed to identify and capture changes in value sensing, creation, distribution and capture. Therefore, a new holistic business model framework is needed for this study.

A systematic literature review was conducted on previous studies of business models, which included both emerging new business models and reconfigured traditional business models enabled by digital technologies. A systematic review follows a rigorous process, which aims to identify, analyse and synthesise research evidence on a specific research topic in a systematic manner (Transfield *et al*. 2003; Pettigrew & Roberts, 2006). The *ISI Web of Knowledge* was used, which pools four indices: Science Citation Index (SCI), Social Sciences Citation Index (SSCI), and Arts and Humanities Citation Index (A&HCI) since 1970, plus Conference Proceedings Citation Index-Science (CPCI-S) since 1990. A systematic search of relevant publications was conducted in Business Management, Innovation, E-Commerce and E-Business, Computing and Information Systems, and Social and Behavioural Studies. A

multi-staged filtering process was followed to narrow down the references, through a combination of key words, year of publication, and relevance of title and abstract. In addition, based on existing knowledge and peer recommendations, key references from known authorities on the subject were identified.

The keyword search of 'Business Model' or 'Business Models' in Title generated 7610 returns. By limiting the search to 2010-2016, the number was reduced to 1239, of which 796 were journal articles and editorials. By further refining the search with the word 'Technology' or 'Technologies', 174 papers were identified, which was further reduced to 33 when the word 'Digital' or 'Information' were added. The titles and abstracts of the 174 papers were downloaded, and from which, 50 papers were selected through a manual process, with a particular focus on business model constructs and the role of digital technologies.

The papers included several recent comprehensive reviews, which covered previous research on business models. Zott, Amit and Massa (2011) reviewed 103 papers (selected from 1253) on business models and found that the literature has largely developed in three silos, namely, e-Business and information systems, strategic management, and innovation management. Despite significant conceptual differences between these studies, they also identified five common themes. First, business model is emerging as a new unit of analysis. Second, it emphasises a holistic approach in explaining how firms do business. Third, it focuses on the activity system of the firm and its partners. Fourth, both value creation and capture are included. Fifth, digital technologies are a key enabler of new business models.

Several other review papers and journal special issues were identified (e.g. Demil & Lecocq, 2010; Baden-Fuller & Haefliger, 2013; Spieth, Schneckenberg & Ricart, 2014; Visnjic, Wiengarten & Neely, 2016). These papers collectively provided the starting point for this review. Through a reverse search, some key seminal works were identified from the citations, which were then combined with the 50 identified papers. A total of 80 papers and a

number of books and chapters were also used for this study. The focus is on the definitions and key constructs of business models, and the role of digital technologies in enabling business model innovations. An initial holistic business model framework is developed based on the review, which is then refined and extended through discussions with other academics and with business leaders in our case studies and in the invited the workshops. This process will be discussed in more detail later in this paper.

Defining Business Models

Business models are a complex, multi-dimensional concept. It has been defined by previous studies as 'a *statement* (Stewart & Zhao, 2000), a *description* (Applegate, 2001; Weill & Vitale, 2001), a *representation* (Morris, Schindehutte, & Allen, 2005; Shafer, Smith, & Linder, 2005), an *architecture* (Dubosson-Torbay, Osterwalder, & Pigneur, 2002; Timmers, 1999), a *conceptual tool or model* (George & Bock, 2009; Osterwalder, 2004; Osterwalder, Pigneur, & Tucci, 2005), a *structural template* (Amit & Zott, 2001), a *method* (Afuah & Tucci, 2001), a *framework* (Afuah, 2004), a *pattern* (Brousseau & Penard, 2006), and a *set* (Seelos & Mair, 2007)' (Zott, Amit & Massa, 2011, pp1022). A more recent review by Massa, Tucci & Afuah (2017) identified 71 definitions/conceptualizations of the business model from 89 papers and outlined their first order components and themes. These definitions only partially overlap, which promote dispersion rather than convergence of perspectives. Most previous studies focused only on one or some aspects of the concept.

First, business models are often defined as models, or cognitive configurations as representation of a class of firms in the way they operate rather than something real, similar to scale models that can be presented, illustrated and manipulated (Furnari, 2015). In this sense, a business model is not a complete description of what a firm does, but a '*stripped-down characterization that captures the essence of the cause–effect relationships between customers, the organization and money*' (Baden-Fuller & Mangematin, 2013, pp419).

Second, business models are also treated as recipes, ideal types or role models that firms aspire to become, often used to plan business model innovations (Johnson, Christensen & Kagermann, 2008; Doganova & Eyquem-Renault, 2009; Sabatier, Rouselle, & Mangematin, 2010). Third, some studies identified specific types of business models, including both empirically-based taxonomy (Timmers, 1999; Rappa, 2016) and theoretically-inspired typology (Afuah & Tucci, 2001; Massa & Tucci, 2012). Fourth, some ontological business models frameworks have been developed for communications between heterogeneous groups (e.g. Al-Debei & Avison, 2010; Lindgardt, *et al*, 2009; Olsterwalder & Pigenour, 2010), although none of them have been universally accepted and their limitations have been highlighted (Spieth, Schneckenberg & Ricart, 2014; Visnjic, Wiengarten & Neely, 2016).

Most previous studies emphasised the notion of value in business models, although some focus on value creation (Chen, Marsden & Zhang, 2012; Porter, Deva & Sun, 2013), while others on value capture (Chesbrough & Rosenbloom, 2002). As will be discussed later in the paper, our initial case studies and discussions with business leaders in workshops also highlighted the need for *value sensing* and *value distribution*, which prompted additional literature review. In this paper, business model is defined as a firm's rationale and logic for value sensing (Day & Moorman, 2010; Teece, 2010), creation (Amit & Zott, 2001; Porter, Kivleniece & Quelin, 2012), distribution (Casadesus-Masanell & Ricart, 2010) and capture (Massa & Tucci, 2012; Baden-Fuller & Mangematin, 2013). It explains how a firm makes money now and in the future, and a good business model can create sustainable competitive advantages (Magretta, 2002; Mitchell & Coles, 2003). By providing the vital link between a firm's vision and strategy with its organisational structures and processes (van der Heijden, 1996; Porter, 2001; Li, 2007), the business model determines the way a firm defines objectives, motivates effort, coordinates activities and allocates resources, as well as its sources of revenue, cost structure, and make-or-buy options (Doganova & Eyquem-Renault,

2009; Seelos, & Mair, 2007). It defines the value logics specific to the firm, and how much room is available for operational manoeuvre (Massa & Tucci, 2012). Many recent business model innovations are enabled by digital technologies (Al-Debei & Avison, 2010; Zott, Amit & Massa, 2011; Klang, Wallnöfer & Hacklin, 2014; Visnjic, Wiengarten & Neely, 2016).

The Key Constructs of Business Models

Previous studies highlighted that a business model consists of multiple layers and components of inter-locked constructs. The top layer is the *value proposition*, which defines the product offerings of the firm, its market segments and its model of revenue generation. The middle layer is the *value architecture*, which defines how a firm senses, creates, distributes and captures values. At the foundation is the *functional architecture*, consisting of core activities of a firm, namely, product innovation and commercialisation, infrastructure for production and delivery, and customer relations management (Abell, 1980; Hagel & Singer, 1999; Li, 2007). Business model innovations can emerge in the value a firm offers its customers; the segment of customers it offers the value to; and its sources of revenue. It can also occur in the way that value is identified, created, distributed and captured; and the activities it must perform to create and offer value to chosen customers, and the organisational capabilities these activities rest on. These constructs are closely and dynamically inter-related with one another.

Evaluate Business Models: Financial Sustainability and Stakeholder Credibility

Since a business model is essential for translating commercial opportunities into revenue generating activities, the most critical criterion for its evaluating is its *financial sustainability* (Desyllas & Sako, 2013; Esslinger, 2011; Lazonick & Tulum, 2011; Seelos & Mair, 2007; Clemons, 2009). Even for organisations not focusing on profit making, financial returns are still important to cover costs and sustain social and cultural objectives. So a

business model is only 'good' if it generates more revenues than it costs; and a 'new' business model needs to create new value adding sources, mechanisms or logics by identifying new value generating opportunities, developing new products and services, or creating new ways of producing, delivering and capturing them. The links between business models and the competitiveness of the firms have been studied by previous research (Casadesus-Masanell & Ricart, 2010; Giesen, *et al*, 2007).

As will be discussed in the research design section, our discussions with business leaders also highlighted the need for a firm to respond to the expectations of key stakeholders, which has not been fully covered by previous research. So an equally important criterion for a 'good' business model is the confidence it can instil in its different stakeholders. In the creative industries, an added consideration is the need to manage the tensions between commercial values and social and cultural values (Bielby, 2011; Roberts, 2010). So a business model should also be evaluated by its *stakeholder credibility* (Froud, *et al*, 2009; Laplume, Sonpar & Litz, 2008). The key stakeholders and their expectations may change over time. Financial sustainability and stakeholder accountability are often linked, particularly because the demands and expectations by stakeholders can significantly influence the structures and goals of the firm and its sources of revenue and controllable costs (Froud, *et al*, 2009). Other criteria – such as operational scalability – were also highlighted by some business leaders, but they were not universally regarded as critical or essential.

Developing a Holistic Business Model Framework

Despite the fact that several business model frameworks have been developed and used by previous studies (e.g. Afuah & Tucci, 2001; Osterwalder & Pigeur, 2010; Al-Debei & Avison, 2010), none of them were able to systematically capture the multiple levels and constructs of the concept; and nor were they universally accepted by researchers or practitioners. Therefore, it is necessary to develop a new framework based on a synthesis of

previous studies, which is further refined and extended through a multi-stage, recursive learning process (Straub & Carlson, 1989). Based on the literature review, an initial business model framework was developed (Figure 1), which was used to guide early case studies and the result was presented to an invited business audience. As will be discussed in more detail later, this framework is refined and further developed based on the empirical research and feedbacks from business leaders through three facilitated workshops. The feedbacks and reflections prompted additional literature review in order to refine and extend the framework, which was used to extend existing case studies and guide data gathering for new ones. After multiple iterations, the holistic framework was finalised as Figure 2.

Insert Figure 1 and Figure 2 about Here

A business model starts with its *Value Proposition* - including product offering, target market segment and revenue model - to reflect the vision and strategy of the firm. The value proposition is underpinned by the *Value Architecture* involving value sensing, creation, distribution and capture. The value architecture is supported by the *Functional Architecture* including product innovation and commercialisation, infrastructure to support production and distribution; and customer relations management. The initial framework focused on the value proposition and value architecture, but discussions with business leaders and the early case studies highlighted the need to include the functional architecture as the operational layer of business model, which prompted further literature reviews to extend the framework.

A business models is evaluated by its *Financial Sustainability* and *Stakeholder Credibility*. The latter is particularly important for organisations focusing on social and cultural values. Many creative organisations are located between profit-making and not-for-profit organisations. Their credibility with key stakeholders is often critical to their survival.

How Digital Technologies Change Business Modes: Automate, Extend and Transform

Digital technologies have been a key driver of business model innovation by enabling new ways of creating and capturing value, new exchange mechanisms and transaction architectures, and new boundary-spanning organizational forms (Al-Debei & Avison, 2010; Gordijn & Akkermans, 2001; Lindgardt *et al*, 2009). The holistic framework enables a systematic examination of business model innovation through digital technologies. Changes in business model constructs can be classified into three broad categories: automation, extension and transformation (AET) (Li, 2007; Lindgardt *et al*, 2009; Massa & Tucci, 2012). Automation refers to cases when a firm uses digital technologies to automate or enhance existing activities and processes, such as displaying information or supporting communications. Extension illustrates cases when a firm uses digital technologies to support new ways of conducting business, which supplement, but not replace, existing activities and processes. Transformation refers to cases when digital technologies are used to enable new ways of conducting business to replace traditional ones. The AET classification enables this study to systematically capture the role of digital technologies in business model innovations.

The Research Design and Empirical Work

Why the Creative Industries?

The creative industries are a significant sector of the world economy. The UK Department of Culture, Media and Sports (DCMS) defined the creative industries as an umbrella term for those industries '*based on individual creativity, skill and talent and have the potential to create wealth and jobs through developing intellectual property*' (DCMS, 1998). This definition has since been widely adopted as a *de facto* world standard (NESTA, 2013; Solidoro, 2009). The UK creative industries are comparable to the financial industry in

size, accounting for about 10% of its exports, with a global reputation in design, fashion, film, game, media, music and publishing (Work Foundation, 2007; TSB,2009; NESTA, 2013).

DCMS (1998) identified thirteen sectors in the creative industries (Table 1), but this is not an exhaustive list. It includes software, but excludes museums and cultural heritages, creative writing and journalism. Many emerging activities, particularly those enabled by digital technologies (such as social media or digital art) are subsumed into existing categories (NESTA, 2013). Some scholars increasingly use the 'creative and cultural industries' as a more inclusive concept (Comunian, 2011; Ferrandiz, 2011; Hesmond & Baker, 2010; Pratt, 2009; Paltoniemi, 2015; Petruzzelli & Savino, 2012; 2015).

Insert Table 1 about Here

The creative industries provide an ideal setting to systematically examine business model innovations; and emerging trends in the creative industries have strong potential to diffuse into other sectors (Lampel & Germain, 2016). They include the full range of organisational characteristics and activities, from large multinationals, national and regional businesses to micro-businesses; and from digital native sectors (such as digital games) where many new business models are developed, traditional sectors that have been transformed by digital technologies (e.g. publishing, advertising, design and music), to areas where the full impacts of digital technologies are still to emerge (e.g. fine art, museums and cultural heritage). Emerging trends in the creative industries have strong potential to diffuse into other sectors of the economy (Lampel & Germain, 2016; Petruzzelli & Savino, 2012, 2015).

The Research Design: Protocols for Validity and Reliability

Given the complexity and nature of the research question, this paper adopts mixed methods to collect and analyse the empirical data (Bartunik, Rynes, & Ireland, 2006; Creswell, 2008;

Harrison, 2013; Fetters, Curry, & Creswell, 2013). Two strands of case studies were conducted for this research, supplemented by three facilitated workshops with invited business leaders and academic facilitators, each addressing a specific aspect of the research question. To ensure validity and reliability, a set of protocols for data collection and analysis were followed (Larsson, 1993; Miles & Huberman, 1994; Yin, 2014). Using theory-guided case studies (Levy, 2008; Eisenhardt, 1989; Li *et al*, 2016), the structure of each case study is defined by the holistic business model framework. Compared with conventional inductive case studies, theory-guided case studies provide more structured explanations of the materials, which enhance internal validity and generalizability (Eisenhardt, 1989).

A large number of case studies were selected to ensure a). all sectors and types of firms in the creative industries are covered, b). both qualitative and quantitative cross-case comparisons can be conducted, following the case survey methodology by Larsson (1993). This also serves to enhance external validity and reduce observer bias (Miles & Huberman, 1994). The case selection is based on two factors: all cases use digital technologies; and collectively they cover all sectors of the creative industries. The research followed the duplication rather than the sampling logic (Yin, 2014). Cross case analysis was only undertaken after a case study has been documented independently (Larsson, 1993).

First, 30 mini case studies were selected globally to identify emerging business model innovations enabled by digital technologies, primarily through online research. These cases were specifically selected for their *perceived* novelty in using digital technologies to support new business models (Table 2). Following the holistic framework, a report was prepared for each case using data from different sources. The focus is on how each business model construct is changed by digital technologies. The case reports were then read by all team members and discussed in group meetings. The initial framework and the mini case studies were then presented to an invited audience of business leaders and academic facilitators for

feedbacks (workshop 1). The purpose is to ensure the framework and the findings accurately reflect radical business model innovations in the creative industries in practice.

The framework is refined and extended based on additional literature review prompted by the feedbacks from the case studies and participants of the workshop. The pricing model in value proposition was extended to revenue model. The value architecture was extended from value creation and capture to including value sensing and value distribution as well (Day & Moorman, 2010; Keen & Williams, 2013; Massa & Tucci, 2012). A new operational layer - the functional architecture - was added to the framework (Figure 2). The revised framework is used to extend all mini case studies and guide the main case studies.

Second, 50 main case studies were selected from different sectors of the creative industries, using semi-structured interviews supplemented by background research from private and published sources. Different from the mini case studies, these cases were selected to provide broad coverage of all sectors and organisational characteristics in the creative industries, although this was partly dedicated by our ability to gain access to senior business leaders. We worked closely with creative industry Trade Associations to identify and gain access. The main purpose was to build on insights from the 30 mini case studies to explore the extent to which digital technologies were used to facilitate business model innovations.

The main case studies included freelance, self-employed artists, micro businesses and SMEs in design and computer games, and multinational firms in advertising, software, publishing and the music industry, covering all sectors of the creative industries. Each case study involved at least one 60-90 minutes interview, usually by two researchers, with a senior executive who has a strategic overview of the firm. Interviews were supplemented by extensive background research. Questions were organised around how digital technologies have facilitated AET - the automation, extension and transformation of different business model constructs. A semi-structured approach was adopted to allow sufficient flexibility for

capturing emerging trends. Notes were taken both during and immediately after each interview, but deliberately not recorded on the advice of some interviewees to encourage uninhibited discussions. Follow up e-mails, phone calls and additional meetings were used for clarifications. A report is written up for every case and discussed in project meetings. The report is then shared with the interviewee for verification (Table 2).

Insert Table 2 about Here

Third, we also conducted three facilitated interactive workshops during different stages of the study, attended by 25, 34 and 40 invited senior business executives primarily from the main case studies. We introduced the project, and the initial framework developed from previous literature is extended through a recursive learning process to ensure it accurately reflects business models in practice. Feedbacks from the participants prompted us to review additional literature and collect further information for the mini and main case studies.

Data analysis started immediately after each case study, structured around the constructs of the holistic framework and how digital technologies facilitated their automation, extension and innovation. Each case is treated independently (Yin 2014), but techniques for constant comparison were used for cross case analysis (Strauss & Gorbin, 1990). The analysis followed a three-step procedure. First, changes in each business model construct in every case study was described, including the nature of the change and the role of digital technologies in facilitating the change. Second, changes in each business model construct were coded as AET - automation, extension and transformation. Third, some significant emerging trends in business model innovation from selected case studies are further analysed.

The protocols were designed to ensure construct and internal validity, including using multiple sources of evidence, establishing chain of evidence, having different researchers and

key informants review draft case reports, undertaking case analysis and cross-case comparison collectively amongst the research team for pattern matching, explanation building, and addressing rival explanations. A shared database for all case studies and supporting materials was created to ensure external validity and reliability.

The empirical analyses are presented in the following three sections: a cross case analysis, the mini case studies, and the main case studies. The results are then synthesised in the discussions and conclusions.

Digital Technologies and Changing Business Models: A Cross Case Analysis

Each of the 30 mini case studies and 50 main case studies were selected, conducted and analysed independently following the duplication logic (Yin, 2014). In every case, changes in each business model construct facilitated by digital technologies were coded as AET - automation, extension or transformation. For every case, the coding is undertaken by two researchers independently. The result is then compared under the guidance of the project leader. Inconsistencies were discussed in group meetings, and resolved collectively.

Changes are observed in all business model constructs, following Larrson's (2003) case survey method. Even when a product cannot be easily digitised (such as live concerts, fine arts), it is often digitally extended (e.g. The Royal Opera House in London live-streams selected performances in cinemas across the UK); and the distribution and interaction with customers (audience) are digitally transformed. In addition to identifying and targeting new customers, digital technologies are often used to add value to core services by extending and enhancing user experience in existing markets. For example, a mobile app was used to supplement oil paintings in exhibition to show the different layers of the paintings and the painting process over time. However, changes are not evenly distributed (Table 3).

Insert Table 3 about Here

The 30 mini case studies were specifically selected for their perceived novelty in adopting new business models. At the value proposition level, 43% (13) used digital technologies to transform their product offerings; 53% (16) transformed their market focuses; and 60% (18) transformed their revenue models. A further 47% (14) extended their product offering, 40% (12) extended their market focus, and 23% (7) extended their sources of revenue. In contrast, those using digital technologies to automate existing constructs are relatively small, with only 3 (10%) in product offerings, 2 (7%) in market focus and 5 (17%) in revenue models (Table 3). At the level of value architecture, the pattern was similar, with many using digital technologies to transform their value sensing (87%), creation (33%), distribution (67%) and capture (80%). At the functional architecture level, 60% transformed their product development; 40% transformed their production and distribution processes; and 80% transformed their relations with customers. Most remaining firms extended the different constructs of their value architecture and functional architecture using digital technologies.

However, similar levels of business model innovation were only found in a small proportion of the 50 main case studies. The majority of the main case studies used digital technologies to extend or automate, rather than transform, their business model constructs.

The Mini Case Studies: The Digital Transformation of Business Models

Further analysis of the mini case studies pinpointed how different business models constructs have been transformed. 90% of them used digital technologies to transform their relations with customers in the activity architecture; 87% redefined value sensing, and 80% transformed their value capture in the value architecture. Interestingly, only 33% transform their value creation; and 43% transformed their product offering. These changes are reflected in a series of significant trends in the digital transformation of business models.

Exclusivity through Personalisation

27 (90%) of the 30 mini case studies used digital technologies to transform their relations with customers. A closer examination of the changing customer relations, together with value sensing and capture, and the target segment and revenue model revealed the increasing use of *exclusivity,* often through *personalisation* of products and services in different firms. Digital technologies are used to enable customers to personalise products to various degrees, and pay different prices accordingly depending levels of exclusivity. This business model innovation was first made popular by *NineInchNails,* the rock band, who successfully sold different packages of their 36 track album – *Ghosts I-IV* - in 2008 using a new revenue model, from a free download of the first volume, a $5 download of all four volumes, two standard CDs for $10, to a premium package including an exclusive vinyl record with a signed book and photograph for US$300. Digital technologies enable them to efficiently identify different types of fans (value sensing, distribution and capture), and manage the relations with them efficiently.

Many others have imitated them. For example, Jill Sobule, a recording artist, offers multiple options to purchase her music at different prices, from a standard CD to a personalised live home concert. The Internet enabled her to reach individual customers easily and maximise revenue according to a customer's ability to pay. Similarly, Carrie Chau sold her (non-digital) artwork online through limited editions only, which ensured premium price through exclusivity. Digital technologies enabled her to identify and reach the small number of potential customers (target segment) around the world who are willing and able to pay premium price for her artworks. The music group Marillion offered fans the opportunity to pre-order its 15th album, and those fans were formally acknowledged in the album. In addition to music, the children's book publisher, Flatten Me, sold personalised books with the

children's photos as characters. This was made possible by the digital uploading of photos and small batch digital printing.

In all these cases, the value propositions were transformed in terms of product offering (exclusive and personalised), target customer segment (wealthy fans) and revenue models (premium prices or differentiated prices based on exclusivity). The value architecture is transformed by using digital technologies to identify customers (value sensing) who are willing and able to pay premium prices for exclusivity and personalisation (value capture). The functional architecture is also transformed, by digitally managing personalised customer relations and the efficient production and delivery of products to different customer segments.

Association and Brand Extension

A closer examination of the transformation of value sensing (26/87%) and value capture (24/80%) highlighted a trend to increase revenue through *association* and *brand extension*. In several cases, designers and artists came together to trade their artworks, which increased the customer base for all and enhanced their credibility collectively. Some artists worked in partnerships with commercial brands to create original characters, which are then licensed to both the commercial brand and in other unrelated areas (target segments). Each additional revenue stream is often small, but the combined revenues can be highly profitable (revenue model). Digital technologies are used to distribute products to different markets and manage relations with customers at low costs (functional architecture).

Business model innovations are reflected in the value propositions in terms of market segments and product offerings. The revenue model is extended from one traditional core market to a portfolio of different markets. At the value architecture level, digital technologies are used to identify new sources of value (value sensing) in adjacent areas; and distribute and capture value in new markets. This maximised value capture for each artist and designer, and increased their financial sustainability and stakeholder credibility.

Brand association can significantly increase stakeholder credibility. For example, antiques - an important cultural sector - are traditionally small volume business, and most independent dealers relied on brick and mortar stores to attract customers in local market. The online channel was primarily used for information and marketing (automation). However, this was changed by the rapid growth of *1stdibs.com*, an antique marketplace started in Paris in 2001 which has successfully gone global. The website charges independent antique dealers a monthly subscription to list their merchandises, but each dealer is carefully vetted, including a visit by the *1stdibs.com* founder Michael Bruno or a member of his team. The vetting gives credibility to the antique dealers listed on the website, and that stamp of approval enables a dealer in the USA to sell a $10000 antique table to a client in the Middle East without first seeing the product. Business model innovations in member antique dealers are significant. Some are able to sell large volumes of antiques internationally online (market segment and revenue model), which is unimaginable through brick and mortar stores. Many of their main income sources have changed from physical stores to online sales (value sensing, distribution and capture); and their customer bases are extended from the local market to the international market. Key to the success of the antique dealers is the increased credibility with international customers afforded by 1stdibs.com.

Pay as Much as You Like, Dynamic Pricing and 'Wisdom of the Crowd'

A new business model was pioneered by *Radiohead* when they released their 7th album, *In Rainbows*, in 2007 using the *'pay as much as you like'* model, which allowed each customer to decide how much they wish to pay. This model was imitated by others, for example, by Aralie.com for music downloading, and by the *Leading to War* documentary film maker who released the film for free download but offered the option to purchase the DVD. This business model exploits the emotional bond and goodwill between artists and customers, using the interactivity of digital channels for distribution and transaction.

Similarly, *dynamic pricing* was adopted by several cases. Amie Street priced music tracks from US$0-0.98 depending popularity, which changes dynamically according to demand. A similar model was adopted by Digonex. This business model was only possible by digitally managing customer interactions and using the Internet as the distribution and transaction channels for value sensing, distribution and capture.

The concept of '*wisdom of the crowd*' inspired a new business model. *Slice the Pie* allows users to rate and determine which music bands are offered recording contracts; and invest real money in artists they like. This is one form of crowd-funding. In doing so, the risks for signing new artists (value sensing) and identifying customers are reduced.

Business model innovations are particularly visible in the revenue model in value proposition; in value sensing and value capture at the value architecture level; and in customer relationships management in the functional architecture (Table 3).

The Main Case Studies: From Automation to Digital Transformation

In contrast to the pervasive business model transformation in the mini case studies, most main case studies used digital technologies to automate or extend their business models.

Automation and Digital Enhancement

All 50 main case studies used digital technologies as a new channel for information or interaction with customers and other stakeholders. They all have websites, either internally maintained or via third party providers. Compared to the mini case studies, many firms used digital technologies to automate, rather than to transform their business models (Table 3).

For example, 74% (37) main case studies maintained traditional revenue models (compared to only 17% (5) of the mini case studies). Many of them continue to rely on funding from public sources (e.g. the Arts Council), or incomes through traditional means such as selling products (e.g. artworks) and services (e.g. live performances and singing

lessons, dancing and performing arts), or renting out facilities and spaces (e.g. studios and art galleries to independent artists). Digital technologies were mainly used to enhance their business models, by providing digital information and facilitate communications with customers and other stakeholders.

Digital Extension of Traditional Business Models

Some main case studies also used digital technologies to extend their business models. For example, 36% extended the market segments in their value propositions, 40% extended their value sensing and value distribution in the value architecture; and 40% extended their customer relations in the functional architecture (Table 3). These firms combined digital with traditional business models to generate additional revenues and increase the reach and impacts of their products, although their core business models were largely retained.

For example, a digital printing firm worked with freelance writers to produce personalised children's books, which are ordered online and then printed and distributed at premium prices, by sharing the digital infrastructure with commercial volume printing. This activity generated additional revenues for the printing firm to supplement its volume printing business; and created new income for freelance writers. However, the personalised children's book business is not commercially viable as a stand-alone business due to its limited volume. Digital technologies were used to enable the provision of a new product and manage the relations with writers and customers at low costs. In doing so, a new value proposition, value architecture and functional architecture were added to the existing one, which enhanced overall financial sustainability.

An art studio displayed online art portfolios for independent artists and graphic designers, which allowed potential customers to buy or rent original or bespoke artworks. The online art portfolios mainly served as an additional channel for independent artists, alongside their own traditional channels, to reach customers. Digital technologies were also

used to facilitate development of new relations with partners; and offered a new interface between sellers and buyers. This created a network effect that benefited all artists, reduced search costs for buyers, and enabled some artists to gain access to digital channels. However, the digital portfolios were mainly used to supplement existing business models by adding new revenues streams, extending value distribution and capture, and generating new customer relations.

A science museum used it website to provide information about displays, new exhibitions, programmes and events, and live video streaming. This allowed the museum to reach a broader audience, including those who are unable to visit the museum in person. Interactive technologies are used extensively in the museum to provide visitors with richer information and interaction to enhance visitor experience. Similarly, the British Fashion Council live-streamed selected fashion shows during London Fashion Week to reach out to broader audience both locally in underground stations and globally via the Internet. The main purpose was to maximise impacts through new digital channels. The product offering is enhanced and customer relations are extended, but the traditional business model is retained.

Digital Transformation of Business Models

Digital technologies were used to transform business models in some of the main case studies. The impact, however, has been mixed, highlighting the high risks involved. Historically, a software firm provided customised software for large clients. The software was developed and implemented to client specifications at premium prices, and once completed the intellectual properties (IP) were transferred to the clients. An opportunity allowed the firm to buy back a project management software from a major client. This enabled the firm to adapt and sell a standardised version of the software to multiple new clients, and also set up an online hosting service for large project management. This led to a fundamental transformation of its business model - described by its CEO as ‘productisation

of services' – from selling customised services to specific clients to selling standardised products and services to multiple clients. The firm can sell the licence multiple times which maximised revenues as the reproduction cost is minimal; and the new hosting service enabled the firm to tie in multiple clients for long periods (e.g. 5-7 years for large construction projects), which stabilised service revenues and significantly improved the firm's financial resilience. Key to the success of the new business model is the pervasive connectivity enabled by broadband and 3G/4G networks to connect with customers.

The business model is significantly transformed. The product offering was transformed from software developed to specifications for one client, to a standard product and a hosting service using the software for multiple clients. The revenue model was changed from charging a few clients premium development fees plus regular service charges, to licence fees plus recurring hosting fees from multiple clients. The value architecture, particularly value sensing and capture, is significantly changed. In the functional architecture, a tailor made product was transformed into a standard product, which is also used to support the hosting service. The infrastructure required for the production and delivery of the product and the hosting service is significantly different from before. Customer relations are transformed from managing customised relations with a few large clients, to managing general relations with multiple clients.

A video game firm historically worked exclusively with major game publishers. The publisher made an upfront payment to fund the development of a new game. Once completed, the game was transferred to the publisher, and the firm then received a small royalty for each copy sold. Even though the firm produced several chart topping games, most profit went to the publishers. With rapid increase in broadband connectivity, the firm decided to use its own cash reserves to fund the development of a new game. The new game was played online rather than distributed by publishers via retail outlets. Through a pay-as-you-play model, the

firm bypassed the publishers and retailers, generating significantly more revenue for itself than through the traditional business model. The new business model also enabled the firm to retain the IPs it created; and live-stream advertising to online gamers to generate new income.

Changes in the business model were extensive. The product offering was transformed from video game as a product distributed by publishers and retailers, to a service based on pay as you play. The revenue model is radically transformed. The new value proposition is supported by new value distribution and capture mechanisms in its value architecture. Changes in the functional architecture are mainly in its infrastructure and customer relations. This new business model worked well for several new games. However, as online games grew exponentially in the market, the firm found it increasingly difficult to attract new customers. Its revenues declined rapidly over a short period, resulting in cash flow problems. This case highlighted the high risks in transforming business models, and the different timescales required for their evaluation.

In several cases, firms used loss leaders to attract customers, and then generated revenues from associated products and services. In a major music label, the firm gave away music through free downloading in order to sell merchandises and live performances for selected artists, essentially changing its product offering from selling music tracks to selling live events, merchandises and advertising. It also experimented with the 'pay as much as you like' model for selected artists, allowing customers to decide how much to pay by capitalising on the strong emotional bond between artists and fans. This enabled the firm to maximise revenues while expand the fan base. The initial financial returns were very encouraging, although the sustainability and transferability of the model are still uncertain.

Discussions: Reflections on Emerging Trends

One of the original objectives of this research was to identify new business model innovations enabled by digital technologies using a large number of case studies. However,

in many cases the new or reconfigured business models are often only new to the firm itself or its sector, but not 'new' in the unprecedented sense, as clear precedents are often found elsewhere. This raises a fundamental question: what is a 'new' business model?

What is a 'New' Business Model? New Concept, New Domain and New Impact

This issue was extensively debated in the three workshops with business leaders and during the case studies, and we found that a business model can be new in at least three different senses. First, a business model can be new because the idea is unprecedented, which is very rare as most ideas have been used somewhere before. Second, in most cases business model innovation is about borrowing an idea from one domain and adapting it for another domain. Third, in some sectors, digital technologies enable the scaling up of a traditional business model by removing conventional barriers, resulting in unprecedented impact. Business model innovations are rarely about creating new business models based on unprecedented ideas. In most cases, digital technologies allow firms to deploy a wider range of business models than previously available to them. This is reflected in the increasing adoption of the 'portfolio models' by some case studies.

The Emergence of the Portfolio Business Models: Four Variants

One significant trend emerging from the case studies is the increasing adoption of the portfolio models in four different variants. The notion of portfolio management is not new (Bardhan, Bagchi & Sougstad, 2004; Faems, Looy & Debackere, 2005; Kang & Montoya, 2013; Kock, Heising & Gemünden, 2015), but so far the literature has not examined the adoption of a portfolio of business models within one firm. The first variant, *the market portfolio model*, is when a firm simultaneously deploys two or more business models to tackle different market segments. Each of the business models might not be new, and the financial returns in some of the markets segments are often financially modest, but by sharing

some components of the business models, the total cost can be contained and the combined revenues often make the 'portfolio' very lucrative, thereby making each market viable. Digital technologies play a key enabling role by reducing costs and making the management of the portfolio administratively and financially viable. Examples were found in several case studies discussed earlier (such as the printing firm and the video game firm discussed earlier).

The second variant, *the product portfolio model*, is based on the fact that many creative products can be consumed at different levels of value-added, or re-combined as new products. This creates opportunities to develop a wide range of new niche products by monetising different stages of work-in-progress. In some sectors, direct contact can be digitally established between consumers and various stages of production, which generated new product types. Consumer choice is increased because work-in-progress can be consumed either independently or as supplement to the final product. For example, an oil painting by a famous artist is sold as the final product, but the images of different stages of producing the painting was digitally captured and consumed either as new products, or as supplements to the final product. One frame of an unfinished painting can be consumed digitally or printed out as a new piece of artwork. Similar examples were found in case studies in films, music, publishing and media. This creates a range of niche markets that supplement the traditional core market. By extracting values from such niches as well as the final product, the combined revenues often significantly enhance the financial sustainability of the business. In some cases, the traditional core product is used as a loss leader so a range of supplement products can be monetised. The extended scope for new products often required the firms to adopt a range of business models and manage them as a portfolio. The main objective was to create a sustainable business by extracting value from products, services and other assets.

The third variant is the so-called *multi-sided business models*, where value is created through interactions with multiple stakeholders upstream, downstream and horizontally in a

complex value network or ecosystem (Bughin, Chui & Manyika, 2010; Lin, Li & Whinston, 2011; Mantena & Saha, 2012; Markides & Charitou, 2004; Smith, Binns & Tushman, 2010). This is different from the market portfolio based on interactions with multiple segments of customers; or the product portfolio where different stages of work-in-progress are consumed either as final products or as supplements to the final product. In multi-sided business models, the firm uses different business models to engage with suppliers, customers and other stakeholders. The digital platform enables the efficient management of multi-sided relations efficiently. Examples are found in the music industry where revenues are extracted through '360 degree contracts', including music sales, advertising, live concerts, merchandise and appearances. Similar examples are found in films and performing arts.

In addition, some firms adopted a portfolio of different business models *sequentially over time*. For example, a digital artist first charged live audience an entrance fee to experience the process of art creation in his digital studio (similar to going to the theatre). The completed digital art is then licenced to clients for a fee. Eventually, the artworks and bespoke products derived from the creation (e.g. a signed print) are sold to collectors.

The level of integration between the business models within a portfolio depends on the nature of the products, services and markets, which can range from a loose collection of discrete business models, to hybrid models where some key components are shared, to the full integration of multiple business models as a new business model. The firm capitalises on its core capability to maximise revenues from different markets, products and stakeholders, by supporting multiple value propositions, value architectures and functional architectures.

Our case studies suggest that the portfolio models can significantly enhance a firm's financial sustainability and stakeholder credibility. By maximising revenues from different market niches, different stages of work-in-progress, or multiple sides of the market, the portfolio model reduces the reliance of the firm on one particular source of income, therefore

reduces risks and increases the overall resilience of the firm. In some cases, when previously insignificant market grows in volume and the traditional market declines, the nature of the business is transformed. Further research should quantitatively examine the profitability of firms using the portfolio models compared to those using a single business model.

Conclusions and Future Research

The paper contributes to our understanding of the theory of business models and how digital technologies have been used to facilitate business model innovations. Based on a comprehensive literature review and the empirical work, a holistic business model framework was developed, extended and validated through a recursive learning process to systematically define business model constructs and their complex relations. The role of digital technologies was systematically captured using the AET classification. Pervasive changes were identified in the value proposition, value architecture and functional architecture of the business models in our case studies. These changes significantly affect the financial sustainability and stakeholder credibility of these firms. An important consideration when evaluating new business models is the time scale, because what works well in the short and medium terms could be disastrous in the long term. A series of significant trends in business model innovations were identified, from increasing use of exclusivity through personalisation, brand extension through association, to dynamic pricing and the pay-as-much-as-you-like models. The findings are not only relevant to policy and practice in the creative industries, but also to understanding the role of creative industries in stimulating innovation and entrepreneurship in high-tech and other sectors of the economy.

Although the research identified examples of new, novel and radically reconfigured business models, most business model innovations are not about creating radically new business models based on unprecedented new ideas, but in enabling firms to deploy a wider range of business models than previously available to them. Traditional business models

were often adapted for new domains or new products in the online environment. It follows that a business model innovation can develop around not only new ideas, but also new application domains or new impacts. This is clearly reflected in the increasing adoption of the portfolio models in four variants - the market portfolio, the product portfolio, the multi-sided business model, and the sequential portfolio.

The 30 mini case studies were selected for their perceived novelty in adopting new business models, and significant changes were identified in their value proposition, value architecture and functional architecture. These changes are reflected in a series of significant trends in business model innovations. However, such business model innovations were only found in some of the 50 main case studies, highlighting the potential for more business model innovations in the future. Many firms in the main case studies used digital technologies to enhance or extend their business models, although many of them expressed strong intentions to introduce more radical business model innovations in the future.

The holistic business model framework is developed and extended through a recursive learning process, which is validated as an effective cognitive instrument for understanding business models and the role of digital technologies in enabling business model innovations. Some business leaders in our case studies and workshops also found the framework useful as a practical tool for planning business model innovations, which should be further examined.

Much remains to be done in future research. Firstly, more research is needed to define the conditions when particular business models should be deployed to enhance their financial sustainability and stakeholder credibility. Second, given the increasing adoption of the portfolio models, new research is needed to quantitatively examine whether the portfolio models can increase a firm's financial sustainability over time, and what types of firms should and should not adopt them. Third, a significant methodological challenge we faced is to investigate emerging trends that are still at very early stages of development with limited

empirical presence. In the area of digital art, for example, traditional business models are no longer valid (what is an 'original' digital art when the artwork can be copied perfectly at no cost?), but new business models are yet to fully emerge. New research methods, such as research prototyping and fictional design, are needed in such areas.

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Table 1. The Main Sectors of the Creative Industries

1	Advertising	8	Film and video
2	Architecture	9	Music
3	Art & antiques markets	10	Performing arts
4	Computer & video games	11	Publishing
5	Crafts	12	Software
6	Design	13	Television and radio
7	Designer fashion		

Source: UK Department of Culture, Media and Sports (DCMS)

Figure 1. The Initial Holistic Business Model Framework

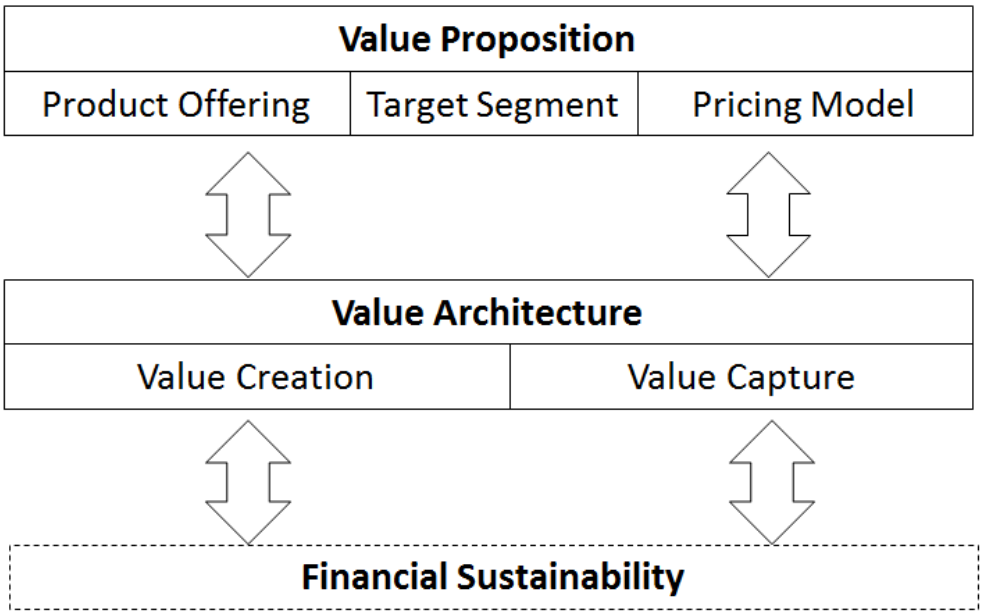

Figure 2. The Holistic Business Model Framework

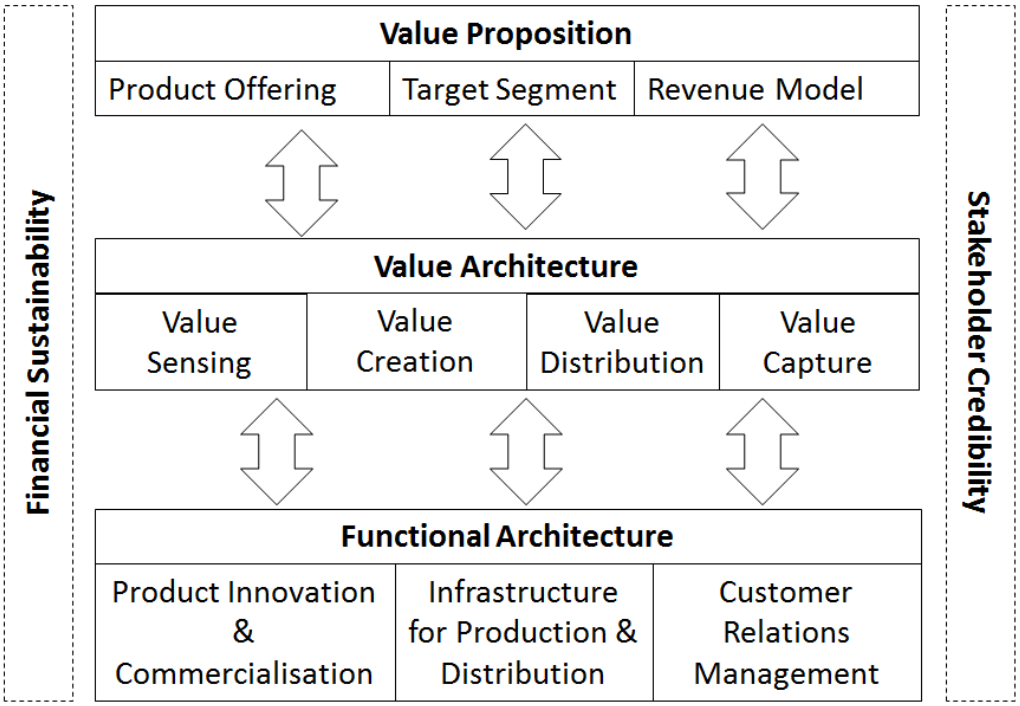

Table 2. The Two Strands of Case Studies

	Mini Case Studies	Main Case Studies
Total Number of Cases	30	50
Advertising	-	3
Architecture	-	2
Art and antiques markets	4	4
Computer and video games	2	4
Crafts	1	3
Design	5	5
Designer fashion	5	2
Film and video	1	3
Music	11	9
Performing arts	-	4
Publishing	1	3
Software	-	3
Television and radio	-	2
Others (e.g. Museums)	-	3
Sizes (No. of Employees)		
<10	13	23
11-50	9	12
51-500	4	6
>501	4	9
Market Orientation		
UK	4	28
European	4	12
Global	22	10

Table 3. How Digital Technologies Change Business Models

	30 Mini Case Studies			50 Main Case Studies		
	Automate	**Extend**	**Transform**	**Automate**	**Extend**	**Transform**
Value Proposition						
Product offering	3 (10%)	14 (47%)	13 (43%)	32 (64%)	17 (34%)	1 (2%)
Market segment	2 (7%)	12 (40%)	16 (53%)	32 (64%)	18 (36%)	0 (0%)
Revenue model	5 (17%)	7 (23%)	18 (60%)	37 (74%)	10 (20%)	3 (6%)
Value Architecture						
Value sensing	1 (3%)	3 (10%)	26 (87%)	24 (48%)	20 (40%)	6 (12%)
Value creation	5 (17%)	15 (50%)	10 (33%)	40 (80%)	9 (18%)	1 (2%)
Value distribution	1 (3%)	9 (30%)	20 (67%)	26 (52%)	20 (40%)	4 (8%)
Value capture	1 (3%)	5 (17%)	24 (80%)	32 (64%)	12 (24%)	6 (12%)
Functional Architecture						
Product innovation	2 (7%)	10 (33%)	18 (60%)	34 (68%)	12 (24%)	4 (8%)
Infrastructure management	2 (7%)	16 (53%)	12 (40%)	30 (60%)	19 (38%)	1 (2%)
Customer relations management	1 (3%)	2 (7%)	27 (90%)	25 (50%)	20 (40%)	5 (10%)